

ABSTRACT

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Electromagnetic and nuclear radiation is detected by micromechanical sensors that can be coated with various interactive materials. As the micromechanical sensors absorb radiation, the sensors bend and/or undergo a shift in resonance characteristics. The bending and resonance changes are detected with high sensitivity by any of several detection methods including optical, capacitive, and piezoresistive methods. Wide bands of the electromagnetic spectrum can be ~~detected~~ ^{imaged} with picoJoule sensitivity, and specific absorptive coatings can be used for selective sensitivity in specific wavelength bands. Microcantilevers coated with optical cross-linking polymers are useful as integrating optical radiation dosimeters. Nuclear radiation dosimetry is possible by fabricating cantilevers from materials that are sensitive to various nuclear particles or radiation. Upon exposure to radiation, the cantilever bends due to stress and its resonance frequency shifts due to changes in elastic properties, based on cantilever shape and properties of the coating.

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